

A NEW SPECIES OF *CTENOICHELES* (CRUSTACEA: DECAPODA: THALASSINIDEA) FROM THE NORTHWESTERN GULF OF MEXICO

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Abstract.—During an extensive U.S. Bureau of Land Management sponsored survey of the south Texas outer continental shelf in the northwestern Gulf of Mexico, 5 specimens of a new species of *Ctenocheles* Kishinouye, 1926, were collected. The species, *C. leviceps*, is described and illustrated with a brief discussion of its ecology and occurrence.

Introduction

The genus *Ctenocheles* Kishinouye, 1926, first described from the Indo-West Pacific, consists of three species known from that region (*C. balssi* Kishinouye, 1926; *C. collini* Ward, 1945; and *C. maorianus* Powell, 1949) and representatives reported from the Atlantic Ocean. The first of these latter occurrences was based on major chelipeds of two species collected off Florida, Panama, and Columbia, which Holthuis (1967), for lack of complete material, designated as *Ctenocheles* A and B. The second was based on major chelipeds collected from Gabon, which Crosnier (1969) was unwilling to designate specifically. Specimens of *C. serrifrons* Le Loeuff and Intes, 1974, were collected from the continental shelf off Ivory Coast and described. Most recently, a new species from the western Atlantic, *C. holthuisi* Rodrigues, 1978, was reported off the mouth of Rio São Francisco, Brazil.

During a U.S. Bureau of Land Management (BLM) sponsored survey of the south Texas outer continental shelf in the northwestern Gulf of Mexico, benthic ecologists from the University of Texas Port Aransas Marine Laboratory collected five specimens of a new *Ctenocheles*. Three specimens were collected in macroinfaunal (>0.5 mm) samples taken with a 0.025-m³ Smith-McIntyre bottom grab; the others were taken with epifauna in a 10.7-m otter trawl.

Samples were taken in 1976 and 1977 at 25 stations (1-6, 7) along 4 transects (I-IV) situated perpendicular to shore from 10 to 130 m (Fig. 1). Additional stations included natural topographic high features at Hospital Rock (HR) and Southern Bank (SB), a rig monitoring station (RM), and a replicate trawling transect (TL) from which the holotype was collected. Detailed description of the study area is given by Groover (1977).

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Ctenocheles leviceps, new species

Figs. 2–29

Holotype.—Immature ♂; complete specimen; total length (approximate), 34 mm; carapace length, 9.5 mm; Gulf of Mexico, ESE of Port Aransas, Texas; 27°38'N, 96°41'W (approximate); type-locality (TL) in Fig. 1; 40 m; 5 December 1977; R/V *Longhorn*; BLM night epifaunal sample; USNM 171576.

Paratypes.—1 immature ♂; complete specimen; total length (approximate), 27 mm; carapace length, 6.1 mm; Gulf of Mexico, ESE of Port Aransas, Texas; 27°45'N, 96°43'W; 31 m; 2 March 1977; R/V *Longhorn*; BLM infaunal sample at RM; USNM 171577.

1 juvenile; complete body but no chelipeds; total length (approximate), 15 mm; carapace length, 3.8 mm; Gulf of Mexico, SE of Port Aransas, Texas; 27°30'N, 96°45'W; 49 m; 6 August 1976; R/V *Longhorn*; BLM infaunal sample, Station 2, Transect II, Replicate 3; USNM 171578.

1 mutilated carapace and major cheliped; carapace length, 4.4 mm; Gulf of Mexico, SE of Port Aransas, Texas; 27°30'N, 96°45'W; 47 m; 7 October 1976; R/V *Longhorn*; BLM infaunal sample, Station 2, Transect II, Replicate 1; USNM 171579.

1 mutilated carapace and minor cheliped; carapace length, 7.0 mm; Gulf of Mexico, S of Port O'Connor; 28°14'N, 96°29'W (approximate); 10 m; 12 June 1976; R/V *Longhorn*; BLM night epifaunal sample, Station 4, Transect I; USNM 171580.

Diagnosis.—Major chela with elongate fingers armed on cutting edge with long, curved, acuminate teeth alternating with numbers of similar but smaller teeth. Palm shorter than fingers, 0.3 of total manus length, swollen, but not exaggerated. Minor cheliped, long and slender, relative lengths of articles similar to major cheliped but without elongate, sharply toothed fingers. Fifth pereopods subchelate. Third maxilliped narrow, pediform with elevated, sharply toothed, thick crista dentata on distal $\frac{2}{3}$ to $\frac{3}{4}$ of ventral surface. Telson slightly shorter than uropods. Posterior margin of uropodal exopod armed with acute spines.

Description.—Carapace contained 3.55 times in total length of body, not covering whole length of cephalothorax, but leaving the last pereopodal segment entirely uncovered. Lateral margin ciliated. Carapace without well-defined oval. Linea thalassinica and cervical groove pronounced.

Rostrum acute, not spinous, laterally compressed, with median dorsal carina and median ventral keel, dorsal margin straight, tip slightly deflected. Rostrum not reaching to end of eyestalks. Two tufts of small setae immediately behind rostral base. Median rostral carina continued posteriorly less than $\frac{1}{3}$ length of carapace. Postrostral carina slightly elevated on gastric region, more pronounced elevation on cardiac region.

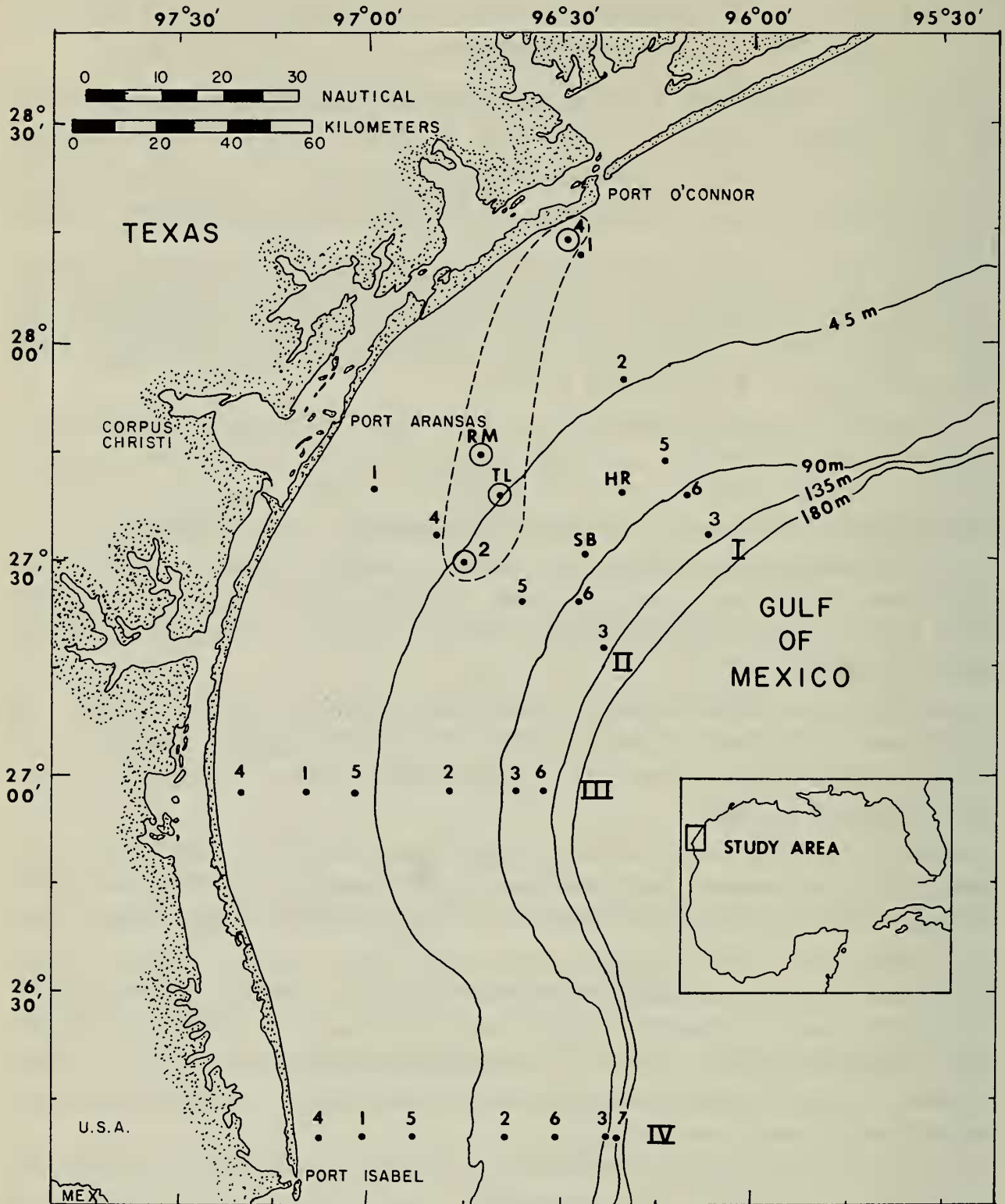
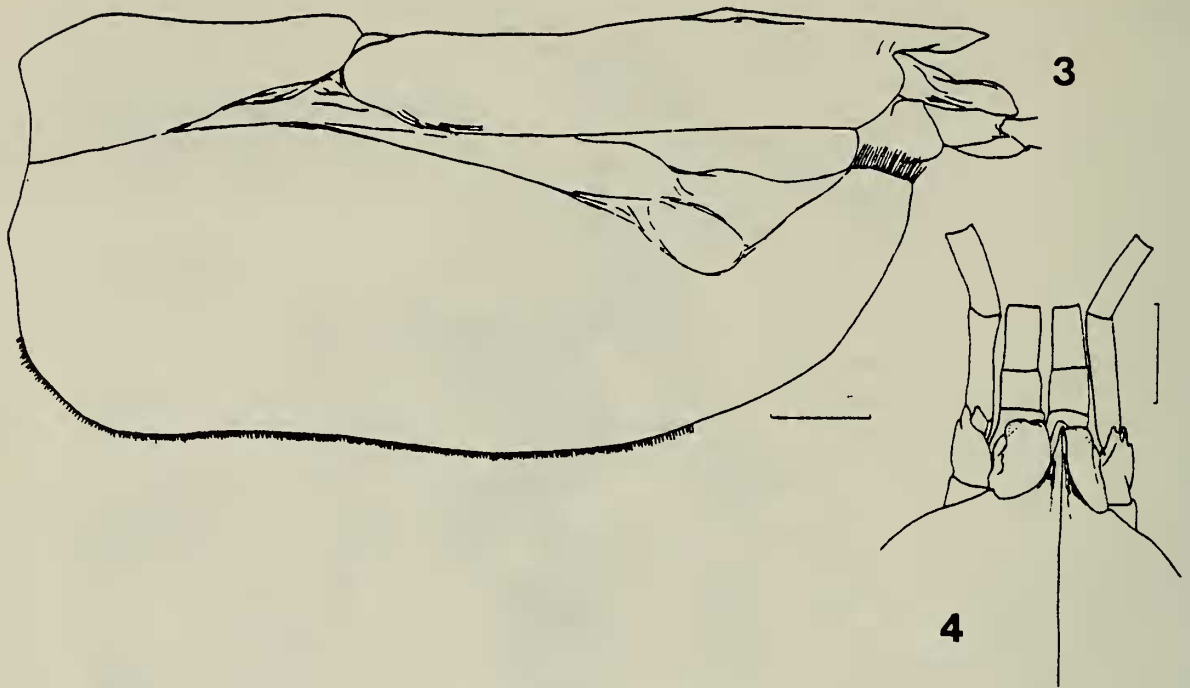


Fig. 1. Map of nearshore northwestern Gulf of Mexico showing sampling stations and transects and localities where *Ctenocheles leviceps* was collected.

Eyestalks generally flattened anteriorly except for bulbous, faintly pigmented subterminal cornea; longer (1.5 times) than wide, not reaching distal margin of first segment of antennular peduncle. Antennular peduncle reaching beyond antennular peduncle. Third antennular segment 1.7 times length of second. Anterior margins of third antennular segment and third antennal



Fig. 2. *Ctenocheles leviceps*, holotype, immature δ , lateral view. Scale = 2 mm.



Figs. 3-4. *Ctenocheles leviceps*, carapace: 3, Lateral view; 4, Dorsal view. Scale = 1 mm.

segment at approximately same level. Third segment of antennal peduncle 1.4 times length of fourth. Two proximal segments of antennal peduncle equal in length to first antennular segment. Antennal scale spined.

Following descriptions based on mouthparts dissected from one of paratypes (USNM 171578). Mandible heavily chitinized, cup-shaped, proximal cutting edge armed with 3 teeth. Anterior edge armed with 2 larger teeth. Small tooth inside cupped area proximally. Mandibular palp 3-segmented, bearing short, stiff terminal hairs. Palp directed posteroventrally over mandible.

First maxilla (maxillula) with 2-segmented endopodite, distal edges of basis and coxa lined with short, spiniform setae.

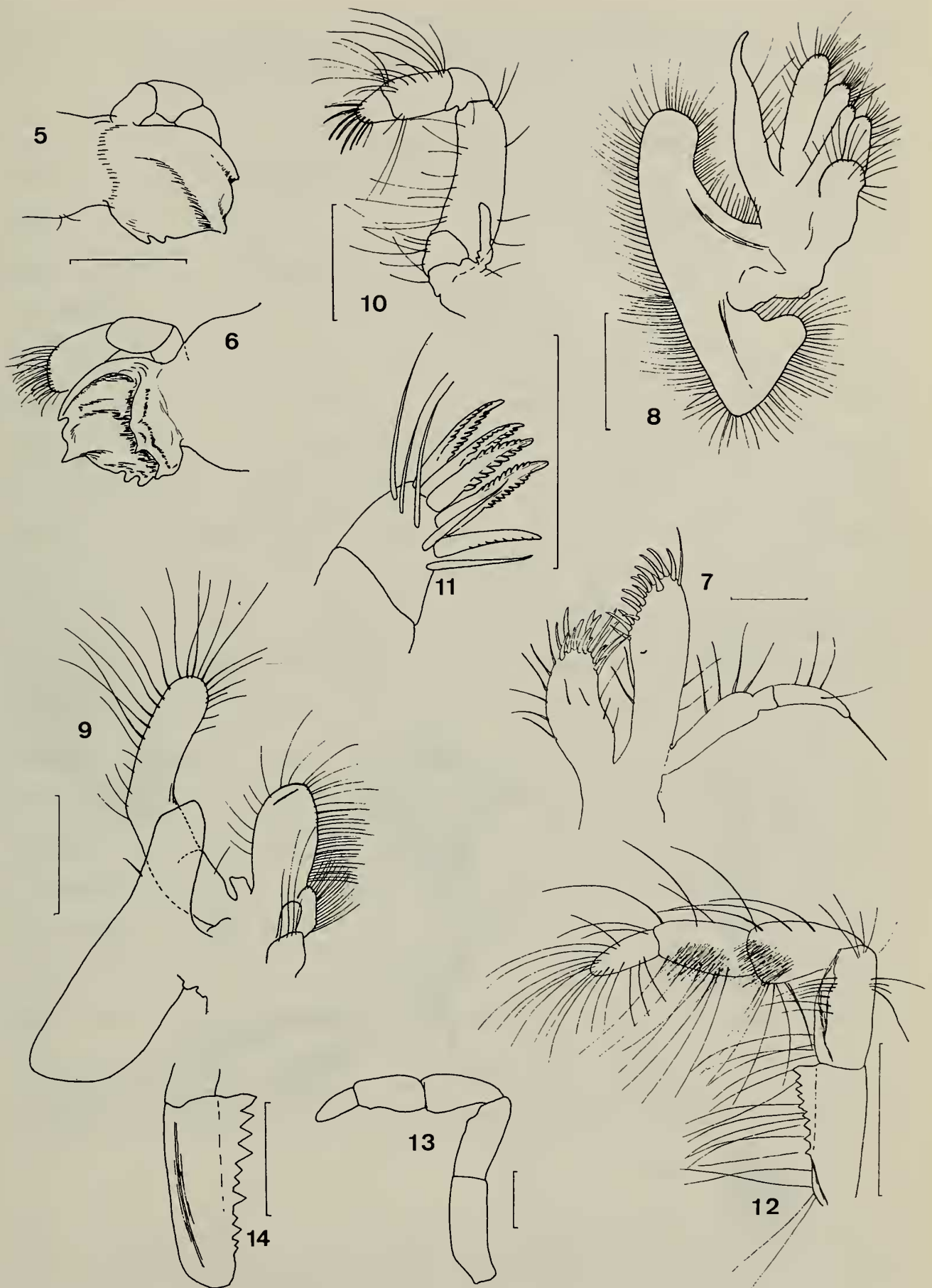
Endopodite of second maxilla, long and digitiform with slightly hooked tip. Scaphognathite enlarged, elongate, anterior lobe rounded distally, posterior lobe quadrate, flared. Endites lined with stiff, finely serrated setae.

First maxilliped with oval endite bearing stiff finely-serrate setae mesially, narrow curved bladelike exopod, elongate epipod produced anteriorly in a short, narrow, quadrate lobe and posteriorly into an enlarged subquadrate projection, and short, truncate endopodite.

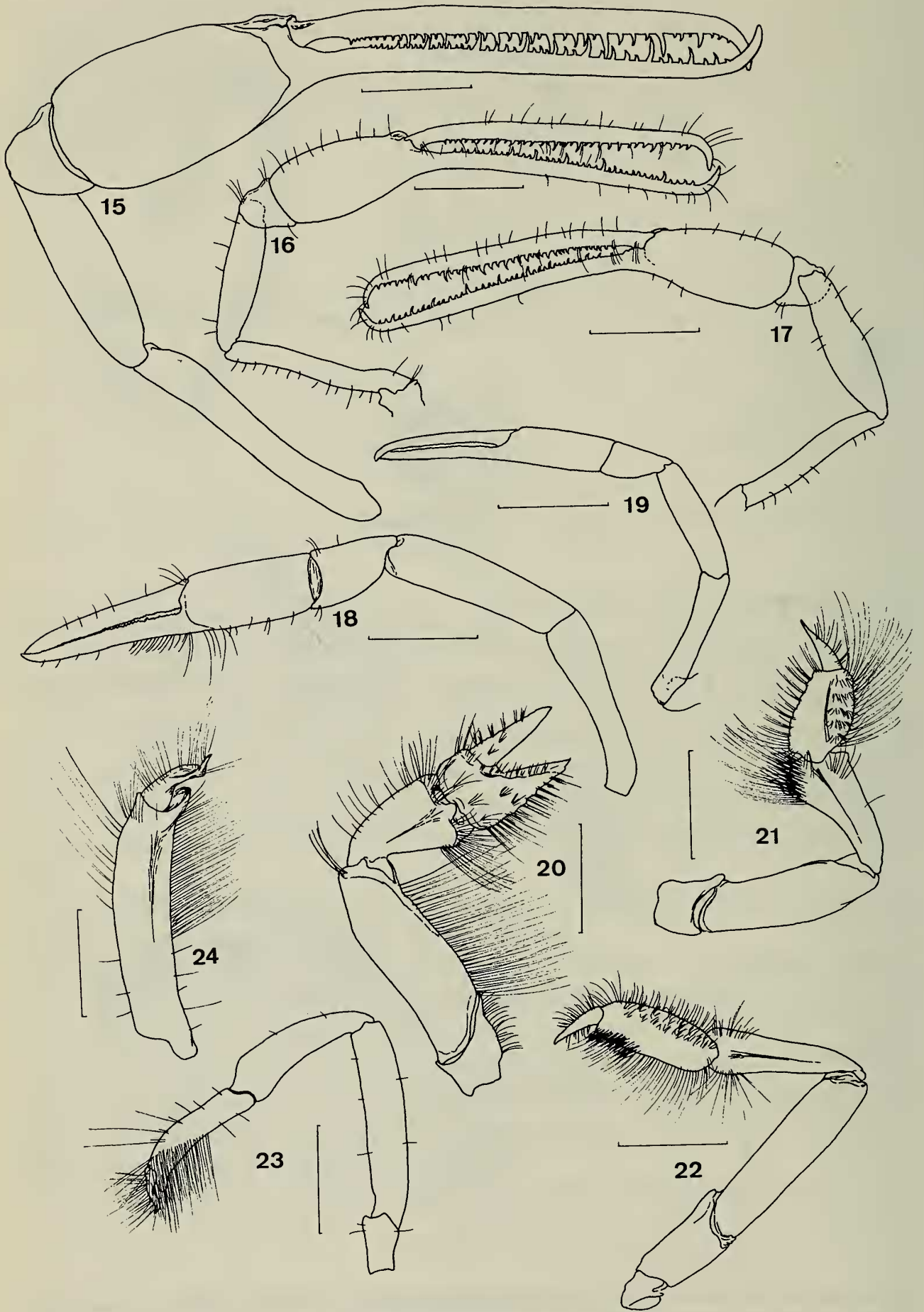
Second maxilliped with short digitiform exopod. Dactylus, propodus, and

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Figs. 5-14. *Ctenocheles leviceps*, mouthparts, drawn from USNM 171578 unless otherwise indicated: 5, Mandible, lateral surface; 6, Mandible, inner surface; 7, First maxilla; 8, Second maxilla; 9, First maxilliped; 10, Second maxilliped; 11, Second maxilliped, enlarged dactyl; 12,



Third maxilliped, mesial surface, USNM 171579; 13, Third maxilliped, outline without setae, USNM 171579; 14, Third maxilliped, crista dentata, holotype. 5, 6, 8-10, scale = .5 mm; 7, 11, scale = .25 mm; 12-14, scale = 1 mm.



carpus of equal width; propodus longer than dactylus and carpus of equal length. Merus slightly curved and longer than first 3 articles combined. Dactylus bearing distal setae armed with double row of blunt teeth.

Third maxilliped narrow, pediform, with exopod. Merus and ischium combined length 3.5 to 4.5 greatest width. Elevated, sharply toothed, thick crista dentata on distal $\frac{2}{3}$ to $\frac{3}{4}$ of ventral surface of ischium. Teeth broadly triangular, not spinous. Carpus enlarged distally, with dense tuft of stiff setae on anteromesial surface. Propodus elongate, length 2.0 times width, with dense tuft of stiff setae on mid-lower mesial surface. Dactylus narrowest and shortest of articles, rounded distally.

First pereopods unequal in size and form. Right cheliped longer (1.7 times) and more developed than left. Major cheliped 0.7 times total body length. Fingers of major chela slender, 1.8 times palm length, ending in blunt, crossed, hook-like tips, dactylus to inside. Fixed finger laterally compressed throughout length, height uniformly decreasing distally. Dactylus broadly rounded at base where attached to palm, becoming laterally compressed distally; height greater than fixed finger, particularly in distal half. Cutting edge of both fingers armed with long, curved, acuminate teeth alternating with numbers of similar but smaller teeth. Longest tooth on dactylus, 0.5 mm. Arrangement of long with shorter teeth similar to that described for *Ctenocheles* A and B by Holthuis (1967). Palm shorter than fingers, 0.3 times length of whole hand, and swollen but not exaggerated; width greater than combined width of closed fingers; upper anterior surface flattened, remainder laterally compressed, equally convex on both sides. Carpus very short, articulating with palm along its anterolateral border as if fused; roughly triangular with rounded ventral border but dorsal margin straighter, more compressed, forming a bridge; articulating with merus on mesial surface at its posterodorsal edge. Merus elongate, tapering at both ends, length 4.0 times width. Ischium longer than merus, narrow (length 7.0 times width), and slightly sigmoid. Other than teeth on fingers, major cheliped is un-toothed and unspined, with sparse, short setae on dactylus, remainder smooth and mostly naked. Major cheliped of smaller specimens more setose.

Minor cheliped long, slender, relative lengths of articles similar to major cheliped, but without elongate, sharply toothed fingers. Fingers slightly lon-

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Figs. 15–24. *Ctenocheles leviceps*, pereopods, drawn from holotype unless otherwise indicated: 15, Right pereopod 1, lateral surface; 16, Right pereopod 1, lateral surface, USNM 171579; 17, Right pereopod 1, mesial surface, USNM 171579; 18, Left pereopod 1, lateral surface; 19, Left pereopod 1, lateral surface, USNM 171577; 20, Right pereopod 2; 21, Left pereopod 3; 22, Left pereopod 4; 23, Right pereopod 5, lateral surface; 24, Right pereopod 5, enlarged mesial view of dactylus and propodus, 15–23, scale = 2 mm; 24, scale = 1 mm.

ger (1.2 times) than palm, laterally compressed, and tapered uniformly to bluntly pointed, slightly hooked, crossed tips; cutting edges slightly serrate. Smaller specimens without serrations on minor chela. Palm slightly wider than combined width of closed fingers, straight on dorsal and ventral margins; articulating with carpus on entire anterolateral margin, similar to major cheliped. Carpus short, elongate-triangular, tapering proximally; ventral surface rounded, dorsal straight. Merus and ischium equal in length, both 4.0 times longer than wide; ischium narrowest in proximal third. Minor cheliped untoothed and unspined, with sparse, short setae on fingers, palm and carpus, remainder smooth and naked.

Second pereopods chelate, compressed. Fingers 2.0 times palm length, cutting edges smooth and sharp. Manus with numerous tufts of short setae. Carpus slightly shorter than manus. Merus length 1.7 times carpus and 4.8 times ischium. Long setae present on ventral margins of ischium and merus, anterodorsal edge of merus, dorsal margin of carpus, and anteroventral edge and anterior border of carpus.

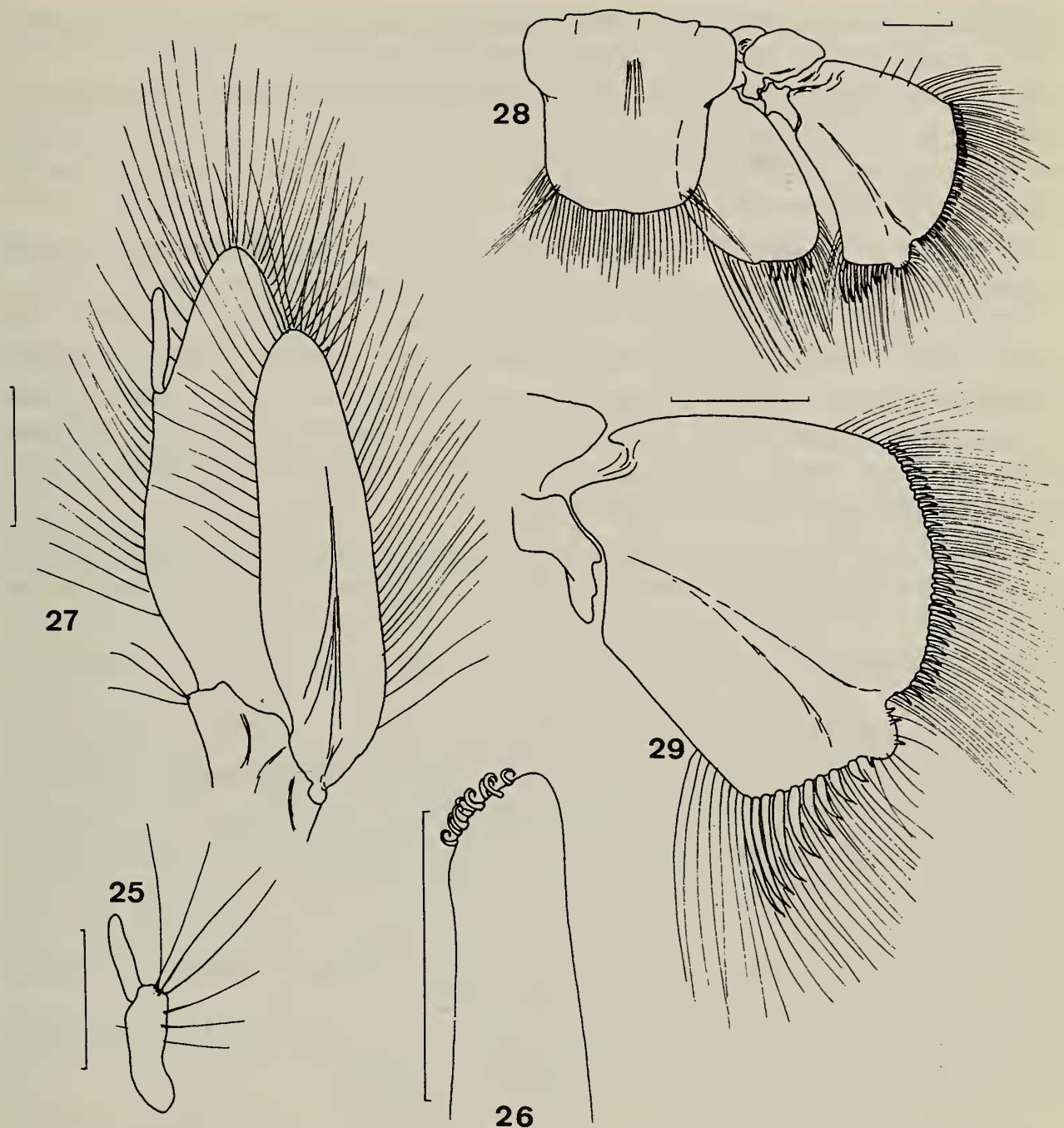
Third pereopods as long as second. Dactylus twice as long as wide, acutely pointed. Propodus and distal part of carpus wide (4.0 times widest part of dactylus). Dactylus and propodus bearing long, fine setae on dorsal and ventral margins, dorsolateral areas of the propodus setose, and anteroventral region of carpus densely setose with long, fine hairs and stiff, short setae. Merus 1.4 times as long as carpus and 3.2 times as long as wide.

Fourth pereopods slightly longer and more slender than third. Dactylus long, slender, acute; propodus wide; carpus long, club-shaped. Dorsal and ventral margins of dactylus, propodus and anterior end of carpus bearing long, fine hairs; propodus setose on dorsolateral edge with dense tuft of stiff, short setae distally on ventrolateral edge. Relative lengths of articles similar to third pereopods.

Fifth pereopods long, narrow and subchelate. Dactylus elongate, curved and flattened, twisting inward and downward halfway toward the distal end, ending in flattened, triangular flare. Fixed finger blunt, short and spoon-shaped. Dactylus length 2.0 times fixed finger. Propodus uniformly curved, 4.4 times longer than wide. Transverse ridge crossing propodus from mid-ventral to anterodorsal borders supporting dense row of thick, stiff setae. Otherwise, dorsal and ventral margins of propodus and dactylus lined with fine, long setae. Carpus and merus scantily haired. Carpus uniformly curved, widened distally.

Arthrobranchs present from third maxilliped to fourth pereopods, inclusive, numbering 2 per appendage.

Abdomen much elongated, pleura little developed and smooth. First abdominal segment widest (1.2 times wider than long); sixth segment longest (1.2 times longer than second, 1.5 times longer than third, 1.6 times longer than fourth, and 2 times longer than fifth). Dorsal surface of each pleuron



Figs. 25–29. *Ctenocheles leviceps*, abdominal appendages, drawn from holotype: 25, Right pleopod 1; 26, Right pleopod 2; 27, Right pleopod 2, enlarged end of appendix interna; 28, Telson and right uropods; 29, Right exopod. 25, 26, 28, 29, scale = 1 mm; 27, scale = .25 mm.

broadly rounded and nearly straight in lateral aspect. Ventrolateral margins of segments 2, 3, 4 and 5 entire; 2 straight; 3, 4 and 5 sinuous; 1 and 6 transverse, chitinized ridge; posterolateral margins of 3 through 5 produced into broadly triangular lobes. Segments 4 and 5 with dense tufts of fine, medium length setae on dorsal and lateral surfaces.

First pleopods (immature ♂) uniramous, 2-segmented; ultimate segment shortest, slightly curved, articulated at anterolateral edge of second, not

bilobed distally and without setae; proximal segment curved, wider on distal end, where about 6 long, fine setae attach to mesial surface.

Second pleopods (immature ♂) biramous; exopod shorter than endopod, both longer than wide (3.0 and 3.5 times, respectively); endopod with appendix interna (?) articulating on mesial margin $\frac{1}{3}$ distance from end, armed distally with short, stiff, curved setae.

Pleopods 3–5 biramous, larger than second, all with short, digitiform appendix interna articulated midway on mesial margin of endopod.

Telson wider than long, abruptly narrowed at $\frac{1}{3}$ length, proximal $\frac{1}{3}$ is 1.4 times wider than distal $\frac{2}{3}$. Remaining lateral edges straight. Posterior margin slightly convex, with shallow depression medially; no median tooth or spine on posterior margin. Tuft of long, fine setae located medially $\frac{1}{4}$ distance from anterior edge, and in each posterolateral corner; posterior margin fringed with fine, medium length setae.

Uropodal endopods extending past posterior margin of telson, elongate oval (inner margin more convex) with long, fine setae on posterolateral edge; distal margin armed with 6 acute, curved spines and slight medial indentation. Endopods of smaller specimens not spined or toothed. Uropodal exopods longer than endopods, fan-shaped, traversed by prominent ridge extending to lobe on distal margin. Margin armed with uniformly small, acute, posteriorly curved spines in anterior $\frac{2}{3}$, and with stronger, acute, anteriorly curved spines increasing in length posteriorly in remaining $\frac{1}{3}$; lobe separating these sets of spines preceded by notch and armed with 4 tiny spines, 3 anterior and 1 posterior. Entire distal margin of exopods lined with long, fine setae.

Color.—Entire animal white when fresh and when preserved in alcohol. Parts of carapace and chelipeds chalky-white.

Etymology.—*Levis*, Latin for smooth; *ceps*, Latin meaning head; referring to the unspined, unserrate, simple head region.

Measurements of holotype (in mm): Total length 34 (estimated), carapace length (including rostrum) 9.5. Telson, length 2.8, anterior width 3.2, posterior width 2.6. Uropodal endopod, length 2.6, width 1.8. Uropodal exopod, length 2.9, width 2.7. Major cheliped, length 23.9; ischium, length 5.2, width 0.7; merus, length 4.3, width 1.0; carpus, length 1.0, width 1.7; manus, length 13.3; palm, length 4.8, width 2.4; fingers, length 8.5, combined width 1.3. Minor cheliped, length 14.0.

Relationships.—The specimens agree with the generic description of *Ctenocheles* outlined by Saint Laurent (1973). *Ctenocheles leviceps* can be distinguished from other species of this genus as follows:

The postrostral carina of *C. balssi* is armed with a low median keel of about 10 minute teeth. The rostrum and postrostral carina of *C. serrifrons* is strongly serrate with a dozen teeth directed forward. *C. maorianus* bears a small rostral spine, and the frontal margin of *C. holthuisi* is trispinous.

Rostrum of *C. leviceps* not spined, toothed, or serrate but acute, plain, laterally compressed, with a median dorsal carina and ventral keel.

The fingers of the major chela of *Ctenocheles leviceps* are not distinctly 2 times longer than the palm as in *C. balssi*, *C. maorianus*, and *Ctenocheles* A and B. The major cheliped of *C. leviceps* is similar to that of *C. collini* in that length of the fingers is less than twice that of the palm; however, the fingers of *C. collini* are of about the same height whereas in *C. leviceps* the height of the dactylus is greater than the propodus, particularly in the distal half. The palm is neither as swollen nor as exaggerated in height as in *C. balssi*, *C. maorianus*, *C. collini*, *C. holthuisi* and *C. A and B*. The major cheliped of *C. serrifrons* was not collected with the specimens taken by Le Loeuff and Intes (1974); however, they felt that the chelipeds collected by Crosnier (1969) from Gabon were very possibly those of *C. serrifrons*. The major and minor chelipeds of *C. holthuisi* are distinctive by the spines on the ischium and merus. It is likely that dimorphism occurs in major and minor chelipeds of *C. leviceps* according to the sex and size of the individual.

Discussion

Ctenocheles leviceps was found in depths from 10 to 49 m, at salinities of 30.15 to 36.63 ‰, in bottom water temperatures of 21.12 to 23.26°C, and in clayey silt sediments (mean grain size 7.5 ϕ). *C. leviceps* was found in an area where other callianassids typical of the south Texas continental shelf did not occur. The collection of only 5 specimens from almost 2000 epifaunal and infaunal samples taken in a study area of 19,250 km² suggests that this species is either extremely rare on the south Texas continental shelf or that it is not subject to frequent collections because of sampling limitations. Possibly, deep burrowing habits and restricted periods of diel activity account for its infrequent occurrence in samples.

Acknowledgments

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Literature Cited

- Crosnier, A. 1969. Sur quelques Crustacés Décapodes ouest-africains. Description de *Pinnotheres Leloeuffi* et *Pasiphea ecarina* spp. nov.—Bull. Mus. Hist. nat., Paris, sér. 2, 41, 2:529–543, figs. 1–36.

- Groover, R. D. (ed.). 1977. Environmental studies, south Texas outer continental shelf, biology and chemistry.—Report to Bureau of Land Management, Wash., D.C., for 1976, Contract No. AA-550-CT6-17.
- Holthuis, L. B. 1967. A survey of the genus *Ctenocheles* (Crustacea: Decapoda, Callinassidae), with a discussion of its zoogeography and its occurrence in the Atlantic Ocean.—Bull. Mar. Sci. 17(2):376–385, figs. 1–2.
- Kishinouye, K. 1926. Two rare and remarkable forms of macrurous Crustacea from Japan.—Japan. Jour. Zool. 11:63–70, figs. 1–2.
- Le Loeuff, P. and A. Intes. 1974. Les Thalassinidea (Crustacea, Decapoda) du Golfe de Guinée Systématique—Écologie.—Cah. O.R.S.T.O.M., sér. Océanogr. 12(1):17–69, figs. 1–21.
- Powell, A. W. B. 1949. New species of Crustacea from New Zealand of the genera *Scyllarus* and *Ctenocheles* with notes on *Lyreidus tridentatus*.—Rec. Auckland Inst. Mus. 3(6):368–371, pl. 68.
- Rodrigues, S. de A. 1978. *Ctenocheles holthuisi* (Decapoda, Thalassinidea), a new remarkable mud shrimp from the Atlantic Ocean.—Crustaceana 34(2):113–120, figs. 1–21.
- Saint Laurent, M. de 1973. Sur la systématique et al phylogénie des Thalassinidea: définition des familles des Callinassidae et des Upogebiidae et diagnose de cinq genres nouveaux (Crustacea Decapoda).—C. R. Acad. Sci., Paris, 277:513–516.
- Ward, M. 1945. A new crustacean.—Mem. Queensland Mus. 12:134–135, pl. 13.

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